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TRANSMITTAL OF APPEAL BRIEF			Docket No. YOR920000109US1	
In re Application of: Maria Ronay				
Application No. 09/577,347	Filing Date May 24, 2000	Examiner P. Ramos	Group Art Unit 1765	
Invention: SELECTIVE POLISHING WITH SLURRIES CONTAINING POLYELECTROLYTES				
<p style="text-align: center;"><u>TO THE COMMISSIONER OF PATENTS:</u></p> <p>Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed: <u>December 23, 2002</u> .</p> <p>The fee for filing this Appeal Brief is <u>320.00</u> .</p> <p><input checked="" type="checkbox"/> Large Entity <input type="checkbox"/> Small Entity</p> <p><input type="checkbox"/> A check in the amount of _____ is enclosed.</p> <p><input checked="" type="checkbox"/> Charge the amount of the fee to Deposit Account No. <u>50-0510</u> . This sheet is submitted in duplicate.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. _____ . This sheet is submitted in duplicate.</p> <div style="text-align: right; margin-top: 20px;"><p><u>Stanley S. Gure 24, 317</u></p><p>Dated: <u>March 24, 2003</u></p></div> <div>Burton A. Amernick Attorney Reg. No. : 24,852 CONNOLLY BOVE LODGE & HUTZ LLP 1990 M Street, N.W., Suite 800 Washington, DC 20036-3425 (202) 331-7111</div>				



Docket No.: YOR920000109US1
(PATENT)

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TC 1700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Primary Patent Application of:
Maria Ronay

Application No.: 09/577,347

Group Art Unit: 1765

Filed: May 24, 2000

Examiner: Perez Ramos

For: SELECTIVE POLISHING WITH SLURRIES
CONTAINING POLYELECTROLYTES

APPELLANT'S BRIEF

Attention: Board of Patent Appeals and Interferences
Commissioner for Patents
Washington, DC 20231

Dear Sir:

This is an appeal from the Primary Examiner's final rejection of claims 13-36.

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is the assignee of the application, International Business Machines Corporation

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant, Appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-36 are in the application. Claims 13-36 are finally rejected and are on appeal. Claims 2-12 have been cancelled. Claim 1 is directed to a non-elected invention and has been withdrawn.

IV. STATUS OF AMENDMENTS

No amendment to the claims was filed after the final rejection.

V. SUMMARY OF INVENTION

The present invention provides for increasing the polishing ratio of silicon dioxide to silicon nitride by including an anionic polyelectrolyte in the polishing slurry (see page 3, lines 8-9). Another aspect of the present invention provides for increasing the ratio of a metal to silicon dioxide, silicon nitride, and/or silicon oxynitride by including a cationic polyelectrolyte in the polishing slurry (see page 3, lines 10-12). According to the present invention, as discussed in the paragraph bridging pages 4 and 5 of the specification, in order to achieve increased selectivity of polishing, the quantity of polyelectrolytes in the abrasive composition is in excess of the amount which absorbs on the surface of the abrasive particles and therefore is present in some extent in the composition as free or unabsorbed polyelectrolytes. It is believed that the portion of the polyelectrolyte in the supernatant portion of the slurry controls the polishing rate selectivity (see page 5, lines 5-6).

More particularly, claim 13 and claims dependent thereon recite employing an anionic polyelectrolyte for increasing the polishing rate ratio of silicon dioxide to silicon nitride (see page 1, lines 11-12) and claim 18 recites entering a cationic polyelectrolyte for increasing the polishing ratio of metal to silicon dioxide, silicon nitride and/or silicon oxynitride (see page 1, lines 12-13).

VI. ISSUES

- A. Has the Examiner established that claims 13-36 are obvious and therefore unpatentable under 35 USC 103 over the cited art and namely U.S.P. 5,645,736 to Allman?

VII. GROUPING OF CLAIMS

Claims 18-21, 28, 29 and 36 do not stand or fall together with claims 13-17, 22-27 and 35.

VIII. ARGUMENTS

A. Allman fails to render obvious claims 18-36.

Claims 13-36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,645,736 to Allman. Allman does not render obvious the present invention.

The present invention provides for increasing the polishing ratio of silicon dioxide to silicon nitride by including an anionic polyelectrolyte in the polishing slurry. In addition, the present invention provides for increasing the ratio of a metal to silicon dioxide, silicon nitride, and/or silicon oxynitride by including a cationic polyelectrolyte in the polishing slurry. According to the present invention, as discussed in the paragraph bridging pages 4 and 5 of the specification, in order to achieve increased selectivity of polishing, the quantity of polyelectrolytes in the abrasive composition is in excess of the amount which absorbs on the surface of the abrasive particles and therefore is present in some extent in the composition as free or unabsorbed polyelectrolytes. It is believed that the portion of the polyelectrolyte in the supernatant portion of the slurry controls the polishing rate selectivity.

Allman does not render obvious the present invention since, among other things, Allman does not suggest that a polyelectrolyte can be used to control the polishing rate selectivity. More particularly, claim 13 and claims dependent thereon recite employing an anionic polyelectrolyte for increasing the polishing rate ratio of silicon dioxide to silicon nitride and claim 18 recites entering a cationic polyelectrolyte for increasing the polishing ratio of metal to silicon dioxide, silicon nitride and/or silicon oxynitride. On the other hand, Allman relates to a polymer and an abrasive particle on a surface to be polished wherein the polymer is employed to form a temporary film to bind the abrasive. The particular polymer employed according to Allman is not critical. Along these lines see column 3, see lines 62-66 which state:

The polymer which is used to form the film forming binder can have a backbone of carbon, silicon, cesium or a combination of these elements, with or without an oxygen or halogen element in the backbone. The structure of the polymer is not critical. (Emphasis mine). In fact, the preferred polymer is a polyorganosiloxane (see col. 4, lines 4-5).

In addition, after the composition is coated onto the substrate, the polymer is then cured by heating such as by a hot plate bake or furnace operation (see column 5, lines 25-35 and the Abstract). The coated substrate is then subsequently contacted with a polishing slurry to thereby

dissolve or deplete the binder of the temporary film and to carry out the polishing. However, using, for instance, a polycarboxylate in place of the preferred polyorganosiloxane in Allman would seemingly not be operative. In particular, it seems likely that the polycarboxylate would form a cured film that would not readily dissolve. Along these lines, see Kirk-Othmer, Encyclopedia of Chemical Technology, Fourth Ed. Volume 7, page 954 which shows the very limited solubility of polycarboxylate coated zinc oxide particles (copy enclosed as Exhibit 1). Likewise see the enclosed copy of US Patent 5,958,794 (Exhibit 2). At most, following suggestions of Allman, but using a polycarboxylate would result in particles coming off in chunks tending to cause damage to the wafers. Also, one should note that Allman fails to include any specific working examples.

Furthermore, Allman does not suggest that when polishing a silicon dioxide surface in contact with a silicon nitride surface that an anionic polyelectrolyte is to be employed. A person skilled in the art would not necessarily select an anionic polyelectrolyte from the numerous polymers suggested by Allman when polishing a silicon dioxide surface in contact with a silicon nitride surface and be lead to believe that the polishing ratio of the silicon dioxide to silicon nitride can be or would be increased.

Additional reasons as to why claims 18-21, 28-29 and 36 do not stand or fall together with claims 13-17, 22-27 and 35

Moreover, with respect to claim 18 and claims dependent thereon, Allman does not suggest cationic polyelectrolytes and nothing whatsoever in Allman suggests that employing a cationic electrolyte for polishing a metal surface would increase the polishing rate of the metal to silicon dioxide, silicon nitride and/or silicon oxynitride in contact therewith. In fact, the Examiner does not contend otherwise. Nowhere does the Examiner assert that Allman even remotely alludes to cationic polyelectrolytes.

Case law concerning 35 USC 103

The mere fact that the cited art may be modified in the manner suggested by the Examiner does not make this modification obvious, unless the cited art suggest the desirability of the modification. No such suggestion appears in the cited art in this matter. The Examiner's attention is kindly directed to *In re Lee* 61 USPQ2d 1430 (Fed. Cir. 2002), *In re Dembiczak et*

al. 50 USPQ2d. 1614 (Fed. Cir. 1999), *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984), *In re Laskowski*, 10 USPQ2d. 1397 (Fed. Cir. 1989) and *In re Fritch*, 23, USPQ2d. 1780 (Fed. Cir. 1992).

In *Dembiczak et al.*, *supra*, the Court at 1617 stated: “Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., *C.R. Bard, Inc., v. M3 Sys., Inc.*, 157 F.3d. 1340, 1352, 48 USPQ2d. 1225, 1232 (Fed. Cir. 1998) (describing ‘teaching or suggestion motivation [to combine]’ as in ‘essential evidentiary component of an obviousness holding’), *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d. 1453, 1459 (Fed. Cir. 1998) (‘the Board must identify specifically...the reasons one of ordinary skill in the art would have been motivated to select the references and combine them’);...”.

Also, the cited art lacks the necessary direction or incentive to those of ordinary skill in the art to render under 35 USC 103 sustainable. The cited art fails to provide the degree of predictability of success of achieving the properties attainable by the present invention needed to sustain a rejection under 35 USC 103. See *Diversitech Corp. v. Century Steps, Inc.* 7 USPQ2d 1315 (Fed. Cir. 1988), *In re Mercier*, 187 USPQ 774 (CCPA 1975) and *In re Naylor*, 152 USPQ 106 (CCPA 1966).

Moreover, the properties of the subject matter and improvements which are inherent in the claimed subject matter and disclosed in the specification are to be considered when evaluating the question of obviousness under 35 USC 103. See *Gillette Co. v. S.C. Johnson & Son, Inc.*, 16 USPQ2d. 1923 (Fed. Cir. 1990), *In re Antonie*, 195, USPQ 6 (CCPA 1977), *In re Estes*, 164 USPQ (CCPA 1970), and *In re Papesch*, 137 USPQ 43 (CCPA 1963).

The Examiner incorrectly relies upon *In re Van Geuns*, 26 USPQ2d 1057 (page 3 of the final rejection) to disregard the results achievable by the present invention which do not need to be explicitly recited in the claims. Furthermore, it seems apparent that the Examiner has neglected to consider the claim recitation “to increase the polishing rate ratio”.

No property can be ignored in determining patentability and comparing the claimed invention to the cited art. Along these lines, see *In re Papesch*, *supra*, *In re Burt et al*, 148 USPQ 548 (CCPA 1966), *In re Ward*, 141 USPQ 227 (CCPA 1964), and *In re Cescon*, 177 USPQ 264 (CCPA 1973).

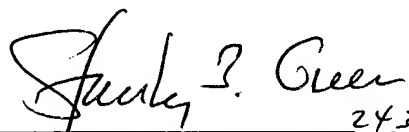
Conclusion

In view of the above, it is abundantly clear that the Primary Examiner erred in finally rejecting claims 13-36. Therefore, it is respectfully requested that the Board reverse the Examiner and allow claims 13-36.

In the event the Examiner deems necessary any further cooperation to further the prosecution of this application, Applicants urge the Examiner to contact the undersigned.

Dated: March 24, 2003

Respectfully submitted,

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APPENDIX – CLAIMS ON APPEAL

13. A method for polishing a silicon dioxide surface in contact with a silicon nitride which comprises providing on the silicon dioxide surface a slurry comprising abrasive particles and an anionic polyelectrolyte in an amount sufficient to increase the polishing rate ratio of the silicon dioxide to the silicon nitride and contact said surface with a polishing pad.

14. The method of claim 13 wherein the polyelectrolyte has a molecular weight of less than about 100,000.

15. The method of claim 13 wherein the polyelectrolyte is selected from the groups consisting of poly (acrylic acid), poly (methacrylic acid), poly (methyl methacrylic acid), poly (maleic acid), and poly (vinylsulfonic acid).

16. The method of claim 13 wherein the polyelectrolyte is poly (acrylic acid).

17. The method of claim 13 wherein the amount of the abrasive particles is about 0.1 to about 20 percent by weight.

18. A method for polishing a metal surface which is in contact with at least one member elected from the group consisting of silicon dioxide, silicon nitride and silicon oxynitride which method comprises providing on the metal surface a slurry comprising abrasive particles and a cationic polyelectrolyte in an amount sufficient to increase the polishing rate ratio of the metal to said member and contacting said surface with a polishing pad.

19. The method of claim 18 wherein the polyelectrolyte is selected from the group consisting of poly (vinylamine), poly (ethylenimine), and poly (4- vinylpyridine).

20. The method of claim 18 wherein the polyelectrolyte is polyethylenimine.

21. The method of claim 18 wherein the metal is W, Cu or Al.

22. The method of claim 13 wherein the polyelectrolyte has a molecular weight of about 300 to about 20,000.

23. The method of claim 13 wherein the abrasive particles comprise a member selected from the group consisting of ceria, alumina, silica and zirconia.

24. The method of claim 13 wherein the amount of abrasive particles is about 0.3 to about 2 percent by weight.

25. The method of claim 13 wherein the amount of said polyelectrolyte is about 0.05 percent by weight.

26. The method of claim 13 wherein the amount of said polyelectrolyte is about 0.05 to about 5 percent by weight.

27. The method of claim 13 wherein the amount of polyelectrolyte is about 0.3 to about 1 percent by weight.

28. The method of claim 18 wherein the polyelectrolyte has a weight of less than about 100,000.

29. The method of claim 18 wherein the polyelectrolyte has a molecular weight of about 300 to about 20,000.

30. The method of claim 23 wherein the abrasive particles comprise a member selected from the group consisting of ceria, alumina, silica and zirconia.

31. The method of claim 24 wherein the amount of abrasive particles is about 0.3 to about 2 percent by weight.

32. The method of claim 25 wherein the amount of said polyelectrolyte is about 0.05 percent by weight.

33. The method of claim 26 wherein the amount of said polyelectrolyte is about 0.05 to about 5 percent by weight.

34. The method of claim 27 wherein the amount of polyelectrolyte is about 0.3 to about 1 percent by weight.

35. The method of claim 13 wherein the slurry is an aqueous slurry.

36. The method of claim 23 wherein the slurry is an aqueous slurry.